

Work Order ID 83695

83695

Page 1

May-30-12 7:46:58 AM

Item ID: D350-748-101

Accept

N900040100

Setup Start *NS1*

Revision ID: U/R

Stop *NS2*

Item Name: Crosstube Installation, High Fwd

Start Date: 4/23/12 Start Qty: 1.00 *1*

Cust Item ID:

Required Date: 5/07/12 Req'd Qty: 1.00 *1*

Customer:

Reference:

Approvals: Process Plan: ✓ Date: _____ Tooling: _____ Date: _____

Run Start *NR1*

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr	Revision Nbr								
D350-748-141	F U/R <i>OK</i> <i>QPR 1/1/12</i>								<i>mw 12/06/22</i>
100		0.00							
100	DOCUMENT CONTROL <i>SD</i>	0.00							<i>w 12.06.25</i>
DC	Memo								
Document Control	Photocopy bluefile & type labels per PPPD350-748-101		CHG002						

110		0.00							
110	BENDING MACHINE - CROSSTUBES	0.00							<i>12-5-10</i>
CNC Bend 1	Memo								
CNC Delta 100 Bender	Bend tube as per Dwg D350-748-141 using CNC bender program D350F and Folio FT _____								

120		0.00							
120	QC15- Crosstube Dimensional Check	0.00							<i>12-5-11</i>
QC	Memo								
Quality Control									

Issue P/O to Metcor P/O: 16954 . C/L 12106104
Rec'd + inspect attached C of C to w/o .

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Item ID: D350-748-101

Accept

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Revision ID: U/R

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Start Date: 4/23/12 Start Qty: 1.00 ***1***

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Required Date: 5/07/12 Req'd Qty: 1.00 ***1***

Customer:

Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____

Run Start ***NR1***

QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
125		0.00							
125									
HandFXtube	Memo	0.00							
Hand Finishing Crosstubes	***Stress relief*** Heat treat crosstube as per QSI010 4.3 Temp: _____ Start time: _____ Finish time: _____	N/A							
127	QC6- Inspect dimensions to drawing	0.00							
127									
QC	Memo	0.00							
Quality Control									

512-5-16

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Item ID: D350-748-101 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: U/R Stop ***NS2***
Item Name: Crosstube Installation, High Fwd
Start Date: 4/23/12 Start Qty: 1.00 ***1*** Cust Item ID:
Required Date: 5/07/12 Req'd Qty: 1.00 ***1*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
130	Crosstubes	0.00							
130									
Crosstubes	Memo	0.00							
Crosstubes	1-Drill Tube as per Dwg D350-748-141 Using DT8876 A,B &C Drill Jigs, Set-up drill table as per QSI 010								12-5-16
	2-Deburr								
	3-Engrave Part # and Batch # as per Dwg D350-748-141								
	4-Remove all marks from tube within limits of D350-748-141								
	5- Apply a light coat of LPS3 on the interior of tube Batch: <u>W/AS</u>								
140	QC5- Inspect part completeness to step on W/O	0.00							
140									
QC	Memo	0.00							
Quality Control	CHECK 10 DEG HOLES WITH DT8876E (EUROCOPTER CLAMP)								

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Item ID: D350-748-101 Accept *N900040100* Setup Start *NS1*
 Revision ID: U/R Stop *NS2*
 Item Name: Crosstube Installation, High Fwd
 Start Date: 4/23/12 Start Qty: 1.00 *1* Cust Item ID:
 Required Date: 5/07/12 Req'd Qty: 1.00 *1* Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start *NR1*
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop *NR2*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
150	Outsource process-Cadplate per QSI017 4.1.9.1	0.00							
150									
Outsource3	Memo	0.00							
Outsource process - Cad plate	Issue P/O: 17084 Stress relief at 375° for 5 hours Magnetic Particle Inspect per ASTM E1444 Cadium Plate per AMS-QQ-P-416B, Class 1, Type 2 Embrittle relief at 375° for 8 hours, Chromate Treat Possible Supplier: Southwest United Industries Ensure Certificate of Conformity is attached								
160	Receive & Inspect for Damage & Mat'l Certs	0.00							
160									
Packaging	Memo	0.00							
Packaging	Ensure certificate of conformity is attached								
170	QC5- Inspect part completeness to step on W/O	0.00							
170									
QC	Memo	0.00							
Quality Control									

★ SEE W/D CHG ATTACHED

ODT P10:17258

CY 12/06/17 x1

see el

Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
11.10.5	161	Load tube to 3500 ^{lb} for 1 minute. REF. DS. Email		CP 12/6/18	1	CP 12/6/18	
11.10.5	162	NDT Tube					

Part No: _____ PAR #: _____ Fault Category: _____ NCR: Yes No DQA: _____ Date: _____

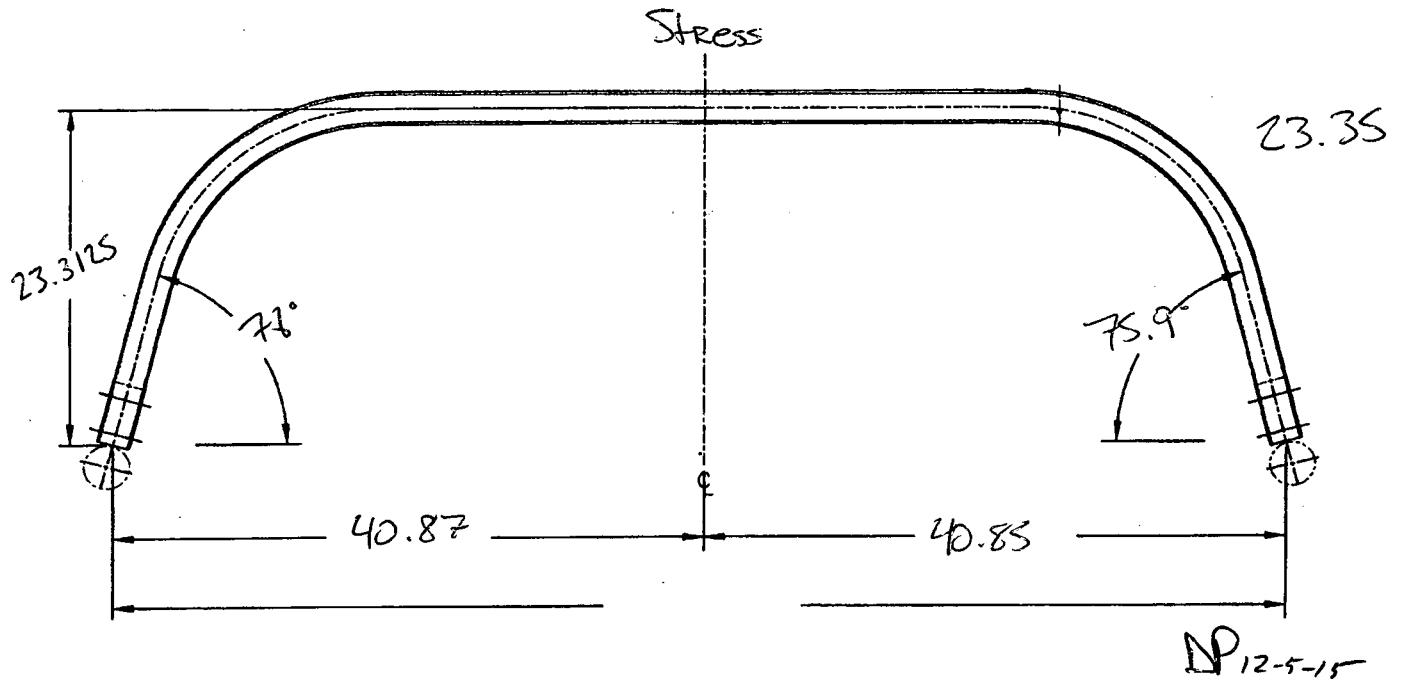
Resolution: _____ Disposition: _____ QA: N/C Closed: _____ Date: _____

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD	Work Order:	83695
Description: Crosstube High Fwd (AS350/355)	Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: F		Page 1 of 1

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
Twist = 0.182
Acceptable <i>[Signature]</i> 12-5-15

QC15 Inspection	
Date	12-5-16

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	
C	11.11.07	Dwg Rev updated	KJ	<i>[Signature]</i>

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Item ID: D350-748-101 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: U/R Stop ***NS2***
Item Name: Crosstube Installation, High Fwd
Start Date: 4/23/12 Start Qty: 1.00 ***1*** Cust Item ID:
Required Date: 5/07/12 Req'd Qty: 1.00 ***1*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
180 *180* SprayPaint Spray Painting	SprayPaint Memo 1-Prime inside crosstube as per QSI 005 4.2 2-Prime Outside of Tube as per Dart QSI 005 4.2	0.00 0.00				<u>1</u>			<u>W 12.06.19</u>
190 *190* QC Quality Control	QC14- Inspect Spray Paint Memo Then, Wrap in plastic bag to protect from scratches	0.00 0.00				<u>Q</u>	<u>B</u>	<u>12.06.24</u>	
200 *200* Crosstubes Crosstubes	Crosstubes Memo 1-Install Ground wire Insert, then insert screw and washer 2-Install Abraison strips as per Dwg D350-748-141 & QSI 035. 3-Install supports Using Dt8876 as per Dwg D350-748-141, Torque to 60-80 IN-LBS	0.00 0.00				<u>1</u>			<u>W 12.06.24</u>

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Item ID: D350-748-101 Accept ***N900040100*** Setup Start ***NS1***
Revision ID: U/R Stop ***NS2***
Item Name: Crosstube Installation, High Fwd
Start Date: 4/23/12 Start Qty: 1.00 ***1*** Cust Item ID:
Required Date: 5/07/12 Req'd Qty: 1.00 ***1*** Customer:
Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____
QC: _____ Date: _____ SPC (Y/N): _____ Date: _____

Run Start ***NR1***
Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
210	QC5- Inspect part completeness to step on W/O	0.00							
210									
QC	Memo	0.00							
Quality Control									
220	Pick Kit	0.00							
220									
Packaging	Memo	0.00							
Packaging									
230	QC4- 100% Inspect kits for completeness	0.00							
230									
QC	Memo	0.00							
Quality Control									

① ② 12-06-25

12/01/22

1 12-06-25

Work Order ID 83695

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Item ID: D350-748-101 Accept ***N900040100*** Setup Start ***NS1***
 Revision ID: U/R Stop ***NS2***
 Item Name: Crosstube Installation, High Fwd
 Start Date: 4/23/12 Start Qty: 1.00 ***1*** Cust Item ID:
 Required Date: 5/07/12 Req'd Qty: 1.00 ***1*** Customer:
 Reference:

Approvals: Process Plan: _____ Date: _____ Tooling: _____ Date: _____ Run Start ***NR1***
 QC: _____ Date: _____ SPC (Y/N): _____ Date: _____ Stop ***NR2***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
240		0.00							
240	Packaging								
Packaging	Memo	0.00							
Packaging	Identify and pack for shipping as per PPP D350-748-101								
	Location: _____								
	PPP Rev: <u>C</u>								
250	QC21- Final Inspection - Work Order Release	0.00							
250									
QC	Memo	0.00							
Quality Control									

12/6/25

MC 12/06/25
 ME
 12-06-25

Picklist Print

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Work Order ID: 83695

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 4/23/12

Required Date: 5/07/12

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev:A New Issue 06-07-05 JLM
 IPP Rev:B Update qty of MS21042L5 06-09-12 KJ VERIFY BY:DD
 IPP Rev:C Rev B 07-11-15 DD
 IPP Rev D Combined manufacturing 08.04.02 EC verified by: DD
 IPP Rev:E 08-06-24 revD as per dwg DD verified by:EC IPP Rev:F 10.08.04 added QSI010
 4.3 DD verf:EC
 IPP REV:G ADD UNDER BEND COMMENT 12-05-28 JLM

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
ALS4-1032-225 Insert		Purchased	No			200	Each	819.0000	1	1		12-06-20	

Location	Loc Qty	Loc Code
ST281	796	
108696	146	
110768	62	
118386	55	
118966	68	
121269	465	1
ST282	23	
120410	10	
120451	13	

AN4-41A Bolt	Purchased	No				220	Each	539.0000	8	8		12/6/22	
-----------------	-----------	----	--	--	--	-----	------	----------	---	---	--	---------	--

Location	Loc Qty	Loc Code
360	181	
121185	181	
ST360	358	
115108	3	
115705	7	
118451	29	
118838	50	
119328	100	
120423	150	
121205	15	
121573	4	

Picklist Print

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Work Order ID: 83695

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 4/23/12

Required Date: 5/07/12

Start Qty: 1.00

Required Qty: 1.00

AN4-6A

Bolt

Purchased No

220 Each 1,514.0000

16

16

Location

Loc Qty

Loc Code

355 222
121631 222
ST356 1292
119017 792
121243 500

AN5-32A

Bolt

Purchased No

220 Each 245.0000

4

4

Location

Loc Qty

Loc Code

ST339 145
119862 50
120423 75
120910 20
ST340 100
121541 100

AN960JD10

Washer

NAS1149D0363J

Purchased No

200 Each 0.0000

1

1

AN960JD416

Washer

NAS1149D0463J

Purchased No

220 Each 30.0000

32

32

Location

Loc Qty

Loc Code

ST351 30
116289 10
119097 20

AN960JDS16

Washer

NAS1149D0563J

Purchased No

220 Each 0.0000

8

8

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Shop Packet Print

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Work Order ID: 83695

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 4/23/12

Required Date: 5/07/12

Start Qty: 1.00

Required Qty: 1.00

D2856-400

Manufactured No

200 f

242.5445

1.181

1.2431579

12-6-20

Abrasion Strip

Location

Loc Qty

Loc Code

ST403

216

81875

216

1.2

ST409

26.5445

63735

0.6696

68076

0.3149

71164

8.46

79551

17.1

Manufactured No

220 Each

75.0000

4

4

D3500-1

Saddle

Location

Loc Qty

Loc Code

ST423

14

78595

14

ST424

31

73405

20

73406

8

76000

3

ST425

30

76940

30

Manufactured No

220 Each

367.0000

16

16

D3501-1

Bushing

Location

Loc Qty

Loc Code

ST051

367

67757

4

73391

6

74866

207

77033

61

81955

26

83253

63

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Work Order ID: 83695

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 4/23/12

Required Date: 5/07/12

Start Qty: 1.00

Required Qty: 1.00

D3502-1 Support Manufactured No 200 Each 21.0000 2 2 AG 12-6-20

Location	Loc Qty	Loc Code
ST051	21	
73419	11	
<u>74873</u>	10	

D350-748-141TRN Crosstube Turning Detail Manufactured No 110 Each 3.0000 1 1

Location	Loc Qty	Loc Code
LG <u>74676</u>	3	
74718	1	
83277	1	
83278	1	

MS210421L4 Nut Purchased No 220 Each 4,059.0000 24 sp 24 12-5-10

Location	Loc Qty	Loc Code
ST300	4059	
119075	125	
121011	677	
<u>121444</u>	2957	
121652	300	

MS210421L5 Nut Purchased No 220 Each 1,447.0000 4 12/6/20

Location	Loc Qty	Loc Code
300	500	
121652	500	
ST300	947	
108827	8	
116105	5	
116548	43	
117611	18	
<u>119109</u>	865	
17651	8	

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Work Order ID: 83695

Parent Item: D350-748-101

Parent Item Name: Crosstube Installation, High Fwd

Start Date: 4/23/12

Required Date: 5/07/12

Start Qty: 1.00

Required Qty: 1.00

MS21920-20 Purchased No

200 Each 86.0000 2 2

Clamp (per MIL-DTL-8783C)

m/12-06-20

Location

Loc Qty

Loc Code

LG050

86

116799

8

120676

8

121067

20

121274

50

MS27039-1-10 Purchased No

200 Each 126.0000 1 1

Screw

m/12-06-20

Location

Loc Qty

Loc Code

GA

100

120449

100

ST291

26

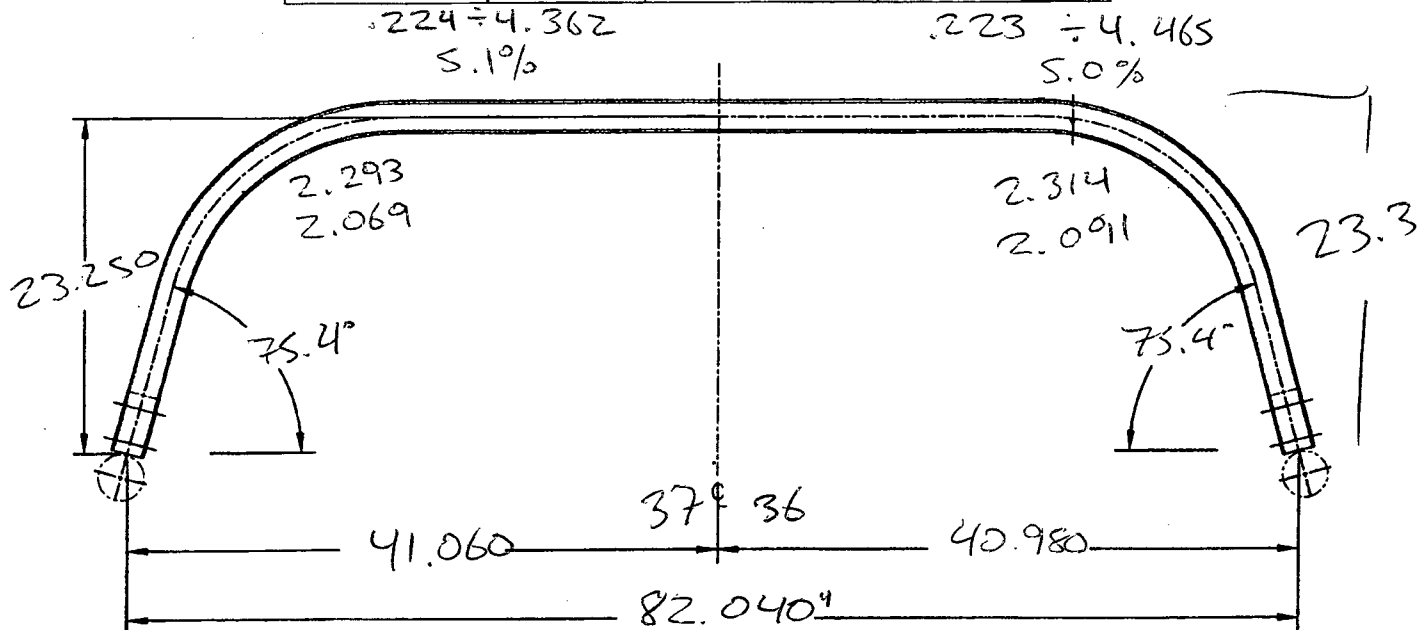
120120

26

*B*122027*

DART AEROSPACE LTD	Work Order:	
Description: Crosstube High Fwd (AS350/355)	Part Number:	D350-748-101
Inspection Dwg: D350-748-141 Rev: F		Page 1 of 1

Required Dimension	Min	Max
Height	23.13	23.37
1/2 Span	40.78	41.02
Angle	75	77
Total Span	81.56	82.04



Comments
Side A = 5.1% crushing @ 37 passes
Side B = 5% crushing @ 36 passes
TWIST = 0.151
OK 12-5-11

QC15 Inspection	12-5-11
Date	12-5-11

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	10.08.23	Dwg Rev updated	KJ	
C	11.11.07	Dwg Rev updated	KJ	

Item	Qty	Part Number	Description
1	X	D350-748-141	CROSSTUBE ASSEMBLY (AS 350/355 HI FWD)
2	1	D6015-125	CROSSTUBE (OR D6017-115)
3	2	D3502-1	SUPPORT
4	2	D2856-400-710	ABRASION STRIP
5	1	AELS-1032-225	INSERT
6	1	NAS1149D0363J	WASHER (OR AN960JD10)
7	2	MS21920-20	CLAMP (PER DART SPEC. M-MS21920-20)
8	1	MS27039-1-10	SCREW

GENERAL NOTES:

- 1) MATERIAL: MANUFACTURED FROM D6015-125 OR D6017-115
FINISHED LENGTH = 110.270±0.06
- 2) FINISH: MAGNETIC PARTICLE INSPECT PER DART QSI 038 4.2
CADMIUM PLATE PER AMS-QQ-P-416B, CLASS 1, TYPE II
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: DART PART NUMBER "D350-748-141" AND BATCH NUMBER ON INSIDE OF CUFF
PER DART QSI 044 6.4 (VIBRATING STYLUS)
- 7) WEIGHT: 30.45 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE, EXCEPT FOR Ø0.297 HOLE.
- 9) BLEND OUT ALL EDGES FROM MACHINING LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
NOTE: ALL HOLES ARE DRILLED AFTER BENDING.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 7 PASSES. MAXIMUM TUBE FLATTENING DUE TO BENDING IS 6% BASED ON O.D.
- 11) HEAT TREAT TO MIN. 180 KSI PER MIL-T-6736 OR AMS 2759-1C AFTER TURNING. ACCEPTABLE TO VERIFY TENSILE STRENGTH BY HARDNESS TEST PER ASTM E18 TO 40-45 HRC.
- 12) INSTALL D2856-400-710 ABRASION STRIPS WITH A GAP ON BOTTOM SIDE OF CROSSTUBE, CENTERED OPPOSITE D3502-1 SUPPORT, PER QSI 035.
- 13) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE. WHEN DRILLING HOLES EXTREME CARE MUST BE TAKEN AND CAREFUL DEBURRING PERFORMED TO ENSURE A CLEAN HOLE WITH NO CRACKING/CHIPPING/GROOVES.
- 14) TORQUE CLAMPS 60 TO 80 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.
- 15) MAX TWIST AFTER BENDING: WITH XTUBE LAYED FLAT ON SURFACE, THE DIFFERENCE BETWEEN CUFF HEIGHTS FROM THE SURFACE MAY BE NO LARGER THAN 0.25 (ZN C1-3).

F	ADD HRC TEST OPTION (B8-1) PER PAR 09-040, ADD TWIST LIMIT (A8-1, C1-3), ADD D6015-125 OPTION (C8-1), STOCK DIM NOW MACHINED (D1-4)	CP	10.11.23
E	REVISE GENERAL NOTES; UPDATE TO CURRENT ADD STANDARDS; RELOCATED FLAG #6 PER PAR 08-046 (ZN A6-3); TOLERANCES (ZN C8-3, D1-3)	RF	09.09.30
D	MAG. PARTICLE AND CAD PLATE AS MFD.	CP	06.10.31
C	ADD CAD PLATING	CP	06.08.14
B	ADD D6017-115 & PRIME AND PAINT	CP	06.06.30
A	NEW ISSUE	CP	06.03.31
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	10.11.23		

DART AEROSPACE LTD
HAWKESBURY, ONTARIO, CANADA

DRAWING NO. D350-748-141
TITLE CROSSTUBE (AS 350/355 HI FWD)
REV. F SHEET 1 OF 4
SCALE NTS

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UNDER REVIEW

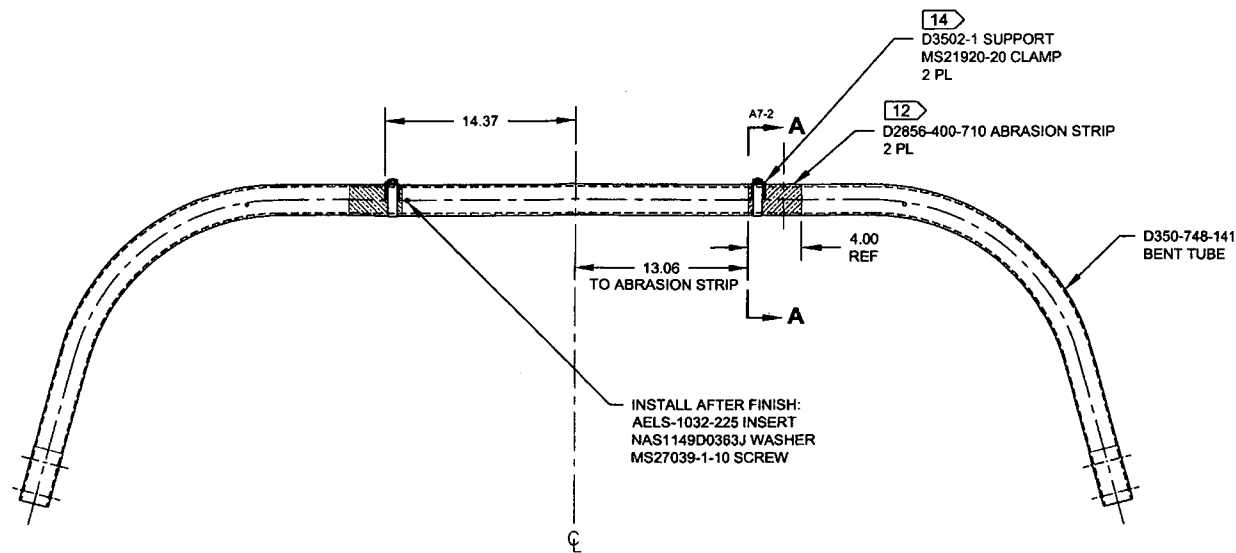
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2011-01-18

836015

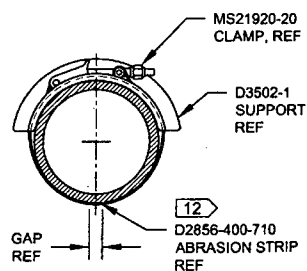
12-4-24

MLW

836as



**D350-748-141
ASSEMBLY DETAIL**



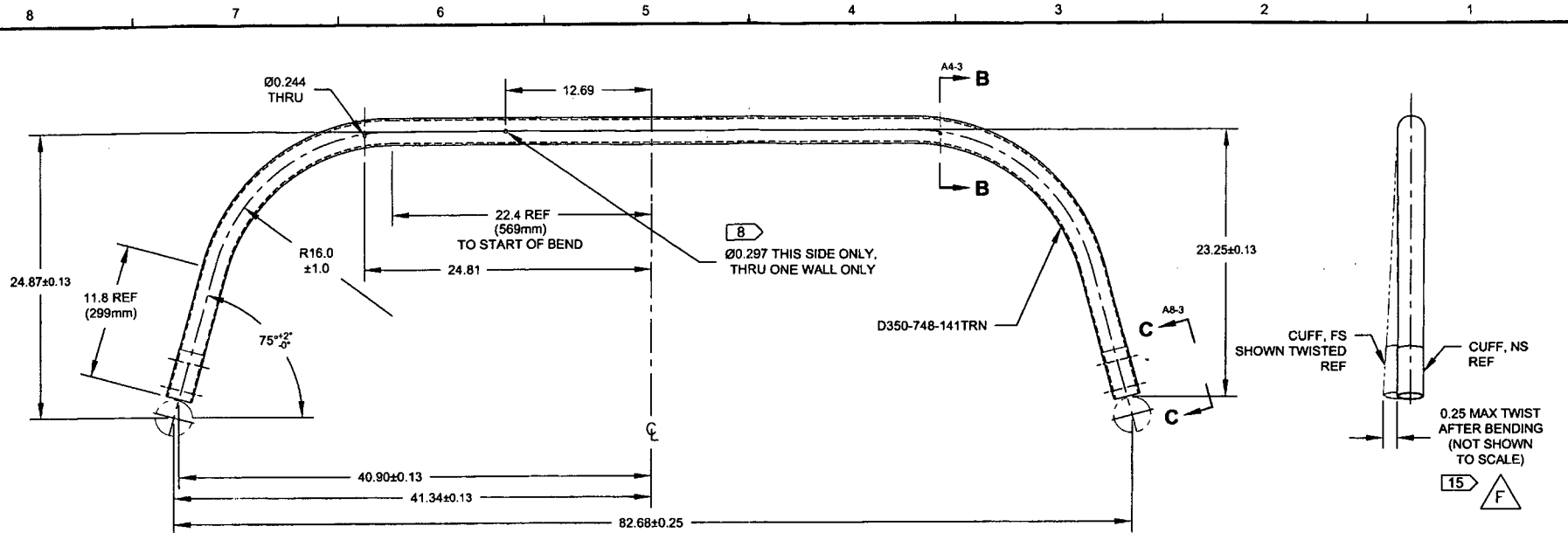
SECTION A-A D4-2
SCALE 4X

UNDER REVIEW

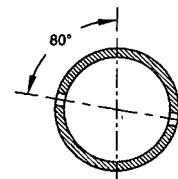
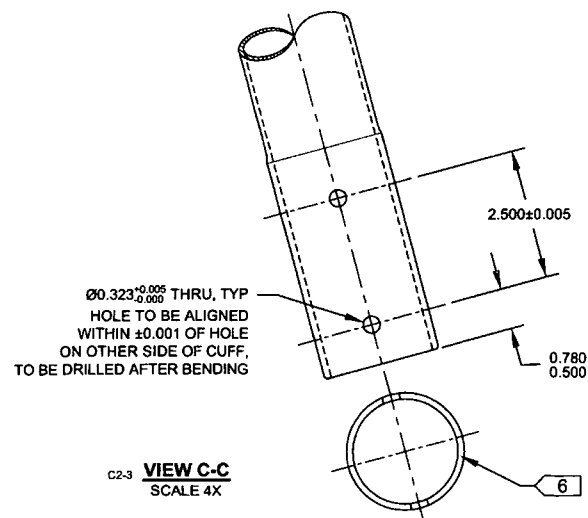
11.07.11

RELEASED
2011-01-18

DESIGN	92	DART AEROSPACE LTD	
DRAWN	92	HAWKESBURY, ONTARIO, CANADA	
CHECKED	92	DRAWING NO.	REV. F
MFG. APPR.	92	D350-748-141	SHEET 2 OF 4
APPROVED	92	TITLE	SCALE
DE APPR.	92	CROSSTUBE (AS 350/355 HI FWD)	NTS
DATE	10.11.23	<small>COPYRIGHT © 2006 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	



D350-748-141
BENDING AND DRILLING DETAIL 10



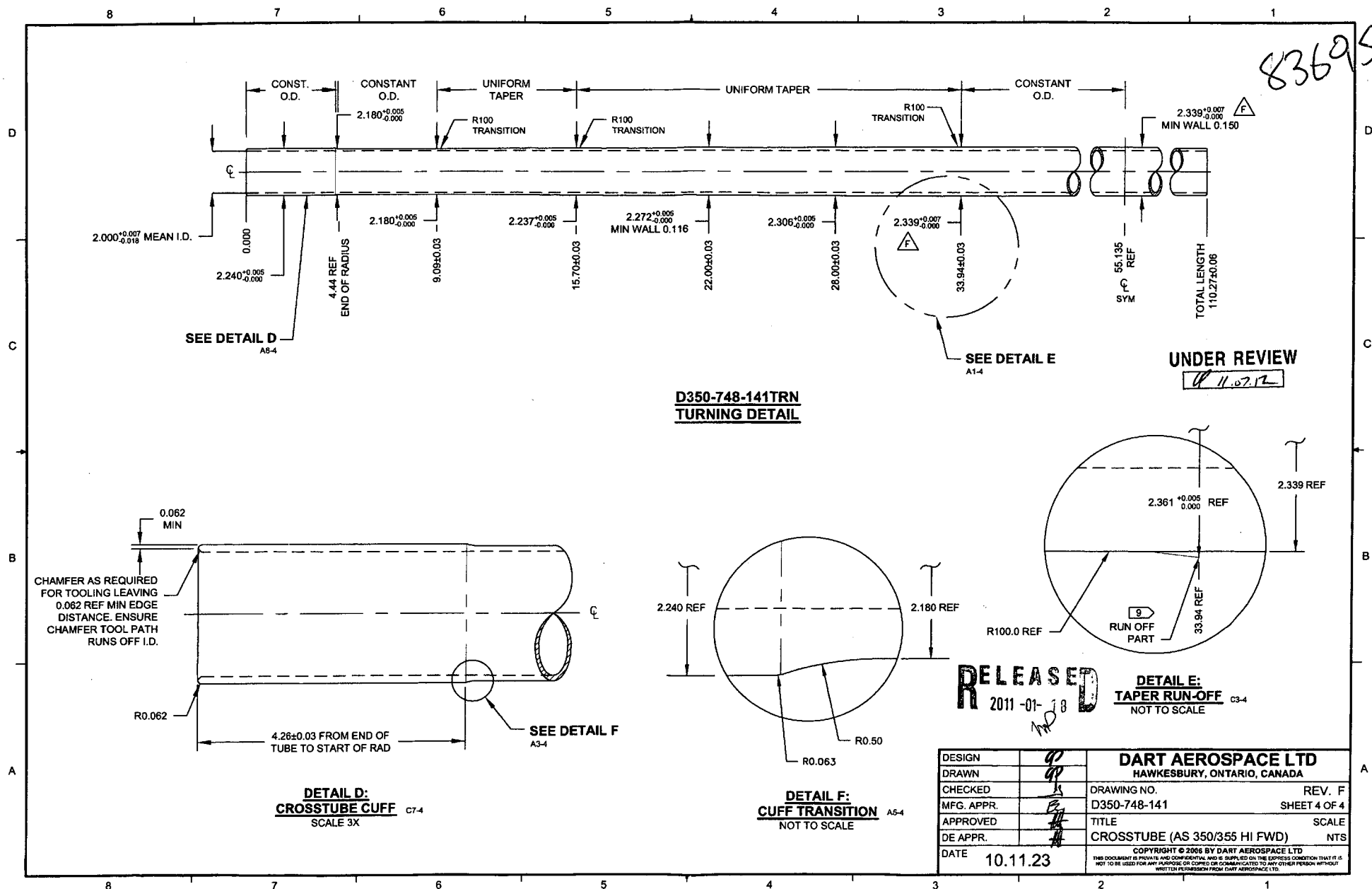
SECTION B-B D3-3
SCALE 4X

UNDER REVIEW

RELEASED
2011-01-18

DESIGN	qp	DART AEROSPACE LTD	
DRAWN	qp	HAWKESBURY, ONTARIO, CANADA	
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83695



3-141		TITLE CROSSTUBE (AS 350/355 HI FWD)		REV. F		DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D350-748-141-F-1		SHEET NO. SHEET 1 OF 1		SCALE NTS	
DRAWN <i>[Signature]</i>		CHECKED <i>[Signature]</i>		MFG. APPR. <i>[Signature]</i>		APPROVED <i>[Signature]</i>		DE APPR. <i>[Signature]</i>					
DATE 12.04.02		DATE 12.04.03		DATE 12.04.03		DATE 12.04.03		DATE 12.04.03					

PURPOSE:

ADD A STRESS RELIEF OPERATION FOLLOWING BENDING

CHANGE:

ADD

10) AFTER BENDING: STRESS RELIEF AT 650°F ± 25°F FOR A MINIMUM OF 2 HRS.
AIR COOL TO AMBIENT TEMPERATURE
(REF. AMS2759/1E)

5.0 PARTS LIST

Qty -101	Qty -201	Part Number	Description
X		D350-748-101	CROSSTUBE INSTALLATION, AS 350/355 HIGH FWD
	X	D350-748-201	CROSSTUBE INSTALLATION, AS 350/355 HIGH AFT
1		D350-748-141	CROSSTUBE ASSEMBLY, AS 350/355 HIGH FWD
	1	D350-748-241	CROSSTUBE ASSEMBLY, AS 350/355 HIGH AFT
*2	*2	D3502-1	SUPPORT
*2	*2	D2856-400-710	ABRASION STRIP
*1	*1	AELS-1032-225	INSERT
*2	*2	MS21920-20	CLAMP
*1	*1	MS27039-1-10	SCREW
*1	*1	AN960JD10	WASHER
4	4	D3500-1	SADDLE
16	16	D3501-1	BUSHING
16	16	AN4-6A	BOLT
8	8	AN4-41A	BOLT
4	4	AN5-32A	BOLT
32	32	AN960JD416	WASHER
8	8	AN960JD516	WASHER
24	24	MS21042L4	NUT (OR MS21042-4)
4	4	MS21042L5	NUT (OR MS21042-5)

* REFERENCE ONLY. PARTS ARE INCLUDED IN D350-748-141/241 ASSEMBLIES ABOVE

REFERENCE ONLY

Chris Provencal

From: David Shepherd <dshepherd@dartaero.com>
Sent: Tuesday, April 27, 2010 3:40 PM
To: 'Mike Petsche'
Cc: 'Bill Beckett'; 'L Lacelle'; 'Chris Provencal'; 'Dan Stow'; ssheldon@dartaero.com
Subject: 350 crosstubes

Mike,

I discussed the 350 crosstube load testing with Bill a little while ago and this plan makes sense to him.

So, my recommendation to clear these crosstubes is to load the fwd crosstubes to 3500 lb and the aft crosstubes to 3000 lb in the deflection test rig and document on the work orders that this test has been completed. Hold max load for 1 minute. Per TP-D350-748-2, these loads represent the maximum load on these crosstubes at gross weight and are below the yield point of the material. I would like to request that Chris Provencal witness these tests and sign off the work orders based on his experience with Dart landing gears. My feeling is that if there is a problem with the parts, it will manifest itself during this load test. I, for one, would feel a lot more confident in testing each crosstube in this manner than relying totally on what Exova has to say. I think it would be very difficult to reach a conclusion on the whole batch on the basis of cracks in two parts from the batch.

I believe that we can accomplish this before next Friday, which also gives us time to hear what Exova has to say in case it has an impact on our decision. So far, what I have seen from Exova shows me that there are fluctuations in the heat treating but the tubes are heat treated to our specification.

For this reason, I believe we should tell DHS that it looks like we will be able to start shipping 350 crosstubes by May 7th pending a successful Engineering test of the material.

David.

Metcor Inc.
 560, boul. Arthur-Sauvé
 St-Eustache (Québec) J7R 5A2
 Tél : 450-473-1887

Certificat de Conformité
Certificate of Compliance

BON DE TRAVAIL order	CHARGEMENT load
175926	1

 **Metcor Inc.**

CLIENT / customer: DART
 DART AEROSPACE
 1270 ABERDEEN
 HAWKESBURY

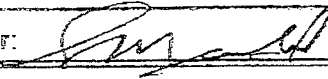
ON K8A 1K7

LIVRÉ À / shipped to:
 DART AEROSPACE
 1270 ABERDEEN
 HAWKESBURY

ON K8A 1K7

COMMENTAIRES / COMMENTS

INSPECTEUR / Inspector:





DATE: 2012-05-14

Metcor Inc.
560, boul. Arthur-Sauvé
St-Eustache (Québec) J7R 5A8
Tél. : 450-473-1884

Certificat de Conformité
Certificate of Compliance

BON DE TRAVAIL order	CHARGEMENT load
175926	1

Metcor Inc.

CLIENT / customer: 215
DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K8A 1K7

LIVRÉ À / shipped to:
DART AEROSPACE
1270 ABERDEEN
HAWKESBURY

ON K8A 1K7

COMMANDE DU CLIENT customer po	SONDE LIVRAISON DU CLIENT customer shipper no.	MATÉRIEL material	CODE DE TRAITEMENT mat'l heat code	NUMÉRO DE LOT lot number
18956		Steel		

SPÉCIFICATIONS DU PROCÉDÉ
processing specifications

PROCES REL

REQUIREMENT REL

REQUIREMENT / requirement SPÉCIFICATIONS / specified TESTS EXÉCUTÉS / performed RÉSULTATS DE TESTS / results

QUANTITÉ quantity	POIDS weight	DESCRIPTION DES PIÈCES parts description
	210	D350-748-101 (1) CROSS TUBE
		(1) D350-748-101 CROSS TUBE
		(1) D350-748-101 CROSS TUBE
		(1) D350-748-101 CROSS TUBE
		(1) D350-748-101 CROSS TUBE
		(1) D350-748-101 CROSS TUBE
		(1) D350-748-101 CROSS TUBE
		CONTENANT: 1 PALETTE

**CERTIFICATE OF
CONFORMANCE**

**CADORATH PLATING CO. LTD.
2150 LOGAN AVENUE
WINNIPEG, MANITOBA R2J-0J1**

DATE: Jun-12-2012

CONSIGNED TO: Dart Aerospace Ltd.
1270 Aberdeen St.
Hawksbury, ON K6A 1K7

W/O #: 114969

INVOICE #: 60875

**CONTRACT OR
PURCHASE ORDER #** PO17084

DESCRIPTION: CROSSTUBE

QTY 1

P/N # d350-748-101

S/N # 83695

STRESS RELIEVE HEAT CHART # 12-546. MPI-IAW ASTM-E-1444.
CADMIUM PLATE IAW AMS-QQP-416C TYPE 2 YELLOW CLASS.
BAKE HEAT CHART # 12-573. MPI IAW ASTM-E1444.

81766/19

CERTIFICATE: I certify that the items indicated here on have been inspected and tested and conform to all specifications and requirements detailed on the contract or purchase order.

Approved Inspector:







LIQUID PENETRANT TEST REPORT

P- 12187

CLIENT DART AEROSPACE DATE JUNE 19/2012 PAGE 1 OF 1
ATTENTION MATT / LINDA ACUREN JOB NO. 188-12-C0265 TIME AM ☒ PM ☐
ADDRESS 1270 ABERDEEN ST. PO/VO NO. 17084
HANKS BURY, ON. WORK LOCATION SAME
DIRECT F.P.I. ON CROSS TUBES ACCEPTANCE STD. ASTM 1417/01-038 REV./DATE 2005
INSPECTED (6 PCS) SEE RESULTS

JOB DESCRIPTION PROCEDURE NO. LT-0002 REV./DATE 2008 TECHNIQUE NO. LT-0012 REV./DATE 2008
PART NO. SEE RESULTS MATERIAL 4130 STEEL THICKNESS VARIABLE
SCOPE A WET FLUORESCENT LIQUID PENETRANT INSPECTION WAS DONE 100% ON THE EXTERNAL SURFACE ONLY

TEST DETAILS
METHOD ☒ FLUORESCENT ☐ VISIBLE ☒ WATER WASH ☐ SOLVENT REMOVABLE ☐ POST EMULSIFIED
FAMILY BRAND MAGNAFLUX BLACK LIGHT S/N 16459 OUTPUT > 1000 μ W/cm² ☐ AMBIENT < 2 fc
PENETRANT ZL07 MINIMUM DWELL TIME 45 MIN. LIGHTING EQUIP. ☐ FLASHLIGHT ☐ TROUBLELIGHT ☐ OUTPUT > 100 fc @ SURFACE
PENETRANT REMOVER H2O MINIMUM DRY TIME >10 MIN. OTHER LAB. NO
DEVELOPER SKD 52 MINIMUM DWELL TIME 10 MIN. LIGHT METER S/N 1098866 CAL DUE DATE JULY 20-2012
DEVELOPER TYPE ☒ NON AQUEOUS ☐ AQUEOUS ☐ DRY

TEST SURFACE
FACE CONDITION ☐ AS GROUND ☐ AS WELDED ☒ MACHINED ☐ SHOT BLASTED ☒ CLEAN BARE METAL
FACE TEMPERATURE ☐ < -4°C/20°F ☐ -4°C/20°F TO 10°C/50°F ☒ 10°C/50°F TO 52°C/125°F ☐ > 52°C/125°F
SULTS- ☒ METRIC ☐ IMPERIAL

W.O. CROSS TUBES

1	-	"	83700	✓
1	-	"	83695	✓
1	-	"	83694	✓
1	-	"	84381	✓
1	-	"	81516	✓
1	-	"	83299	✓

12.06.19

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SIGNATURES

CLIENT REPRESENTATIVE <u>Matthew Murdoch</u> PRINT <u>Matthew Murdoch</u> SIGNATURE	DTR # <u>E-63501</u>
TECHNICIAN (SIGNATURE): <u>Mike Joffe</u> PRINT <u>Mike Joffe</u> SIGNATURE	REPORT REVIEWED BY:
NAME (PRINT): <u>Mike Joffe</u> 1 ST TECHNICIAN <u>2ND TECHNICIAN</u>	NAME INITIALS
CGSB LEVEL <u>II</u> SNT LEVEL <u>6606</u> CGSB REG. NO. <u>6606</u>	CGSB LEVEL SNT LEVEL CGSB REG. NO.